

# Geographic distribution of *Physalaemus cicada* Bokermann, 1966 (Anura: Leiuperidae) in Northeastern Brazil

Marciana Claudio da Silva<sup>2\*</sup>, Deivid Batista de Oliveira<sup>1</sup>, Herivelto Faustino de Oliveira<sup>1</sup>, Igor Joventino Roberto<sup>2</sup>, Drausio Honório Morais<sup>3</sup>, Samuel Vieira Brito<sup>4</sup> and Robson Waldemar Ávila<sup>1</sup>

<sup>1</sup> Universidade Regional do Cariri, Centro de Ciências Biológicas e da Saúde, Departamento de Ciências Biológicas, Coleção Herpetológica, Campus do Pimenta, Rua Cel. Antonio Luiz, 1161, Bairro do Pimenta. CEP 63105-100, Crato, CE, Brazil.

<sup>2</sup> Universidade Regional do Cariri (URCA), Departamento de Ciências Físicas e Biológicas, Laboratório de Zoologia, Programa de Pós-Graduação em Bioprospecção Molecular. Rua Cel. Antônio Luiz Pimenta 1161. CEP 63105-000, Crato, CE, Brazil.

<sup>3</sup> Universidade Estadual Paulista, Campus de Botucatu, Instituto de Biociências, Departamento de Parasitologia. CEP 18618-970. Botucatu, SP, Brazil.

<sup>4</sup> Universidade Federal da Paraíba, Programa de Pós-Graduação em Ciências Biológica (Zoologia). CEP 58051-900. João Pessoa, PB, Brazil.

\* Corresponding author. E-mail: [marciabiologia2007@hotmail.com](mailto:marciabiologia2007@hotmail.com)

**ABSTRACT:** We The leiuperid genus *Physalaemus* is widespread in South America. The Maracas dwarf frog *Physalaemus cicada* occurs in southeastern and northeastern Brazil, mainly in Caatinga biome. Herein, we updated the distribution of *P. cicada*, presenting new data on distribution on Ceará, Pernambuco, Piauí and Rio Grande do Norte states, Brazil.

The Neotropical leiuperid genus *Physalaemus* Fitzinger, 1896 comprises 45 described species (Frost 2011), widely distributed in South America, east to Andes (Nascimento *et al.* 2005). The Maracas dwarf frog *Physalaemus cicada* Bokermann, 1966 (Figure 1), is distributed mainly at northeastern Brazil, with records also at southeastern Brazil in state of Minas Gerais (Nascimento *et al.* 2005; Silveira 2006; Linares and Mello 2011; Frost 2011). It can be found in the Caatinga Biome in the states of Alagoas (Lisboa e Haddad 2009), Ceará (Nascimento *et al.* 2005; Loebmann and Mai 2008), Bahia (Bokermann 1966; Nascimento *et al.* 2005; Santana and Juncá 2007), Paraíba (Vieira *et al.* 2007), Pernambuco (Borges-Nojosa and Santos 2005), Rio Grande do Norte (Jorge and Freire 2012) and Sergipe (Caldas *et al.* 2010), also occurring at localities in transition zones between the Cerrado and Caatinga Biomes in Minas Gerais (Nascimento *et al.* 2005; Linares and Mello 2011) and Piauí states (Benício *et al.* 2012).

Herein, we updated the distribution of *Physalaemus cicada* at northeastern Brazil, extending the known distribution of the species in Ceará, Pernambuco, Piauí and Rio Grande do Norte states, providing a new geographic distribution map for the species (Figure 2, Table 1). Specimens were collected by hand or pitfall-traps with drift-fences during herpetological surveys at several localities from December 2009 to February 2012. Voucher specimens were deposited at “Coleção Zoológica de Vertebrados da Universidade Federal de Mato Grosso” (UFMT-A, Cuiabá, Mato Grosso, Brazil): PIAUÍ - Brejo do Piauí municipality (8°13'36"S, 42°49'51"W; UFMT-A 11165; 11241, 11215); and at the “Coleção Herpetológica da Universidade Regional do Cariri” (URCA-H, Crato, Ceará, Brazil): CEARÁ: municipality of Barro (07°05'29.1"S, 38°43'31.3"W; URCA-H 686-687), Várzea Alegre (06°52'20.5"S, 039°13'03.8"W; URCA-H 3001-3002), and Acopiara (06°12'22.8"S,

039°30'14.6"W; URCA-H 3181-3183), municipality of Farias Brito (06°78'32"S, 39°53'31"W; URCA-H 5187, 5201-5205), municipality of Missão Velha (07°15'58.2"S, 39°04'55.8"W; URCA-H 5456), municipality of Aiubá (06°39'41.7"S, 40°06'23.3"W; URCA-H 5319-5324); PERNAMBUCO: municipality of Ouricuri (08°07'55.7"S, 040°05'03.2"W; URCA-H 1069, 1071); RIO GRANDE DO NORTE: municipality of João Câmara (05°33"S, 35°56'W; URCA-H 2927-2935). Individuals were also recorded calling at Reserva Natural Serra das Almas, municipality of Crateús (5°16'04"S, 40°54'13"W), state of Ceará, municipality of Parnamirim (04°36'78.1"S, 91°06'41"W), state of Pernambuco and at municipality of Guamaré (05°13'8.45"S, 34°41'6.81"W), state of Rio Grande do Norte.

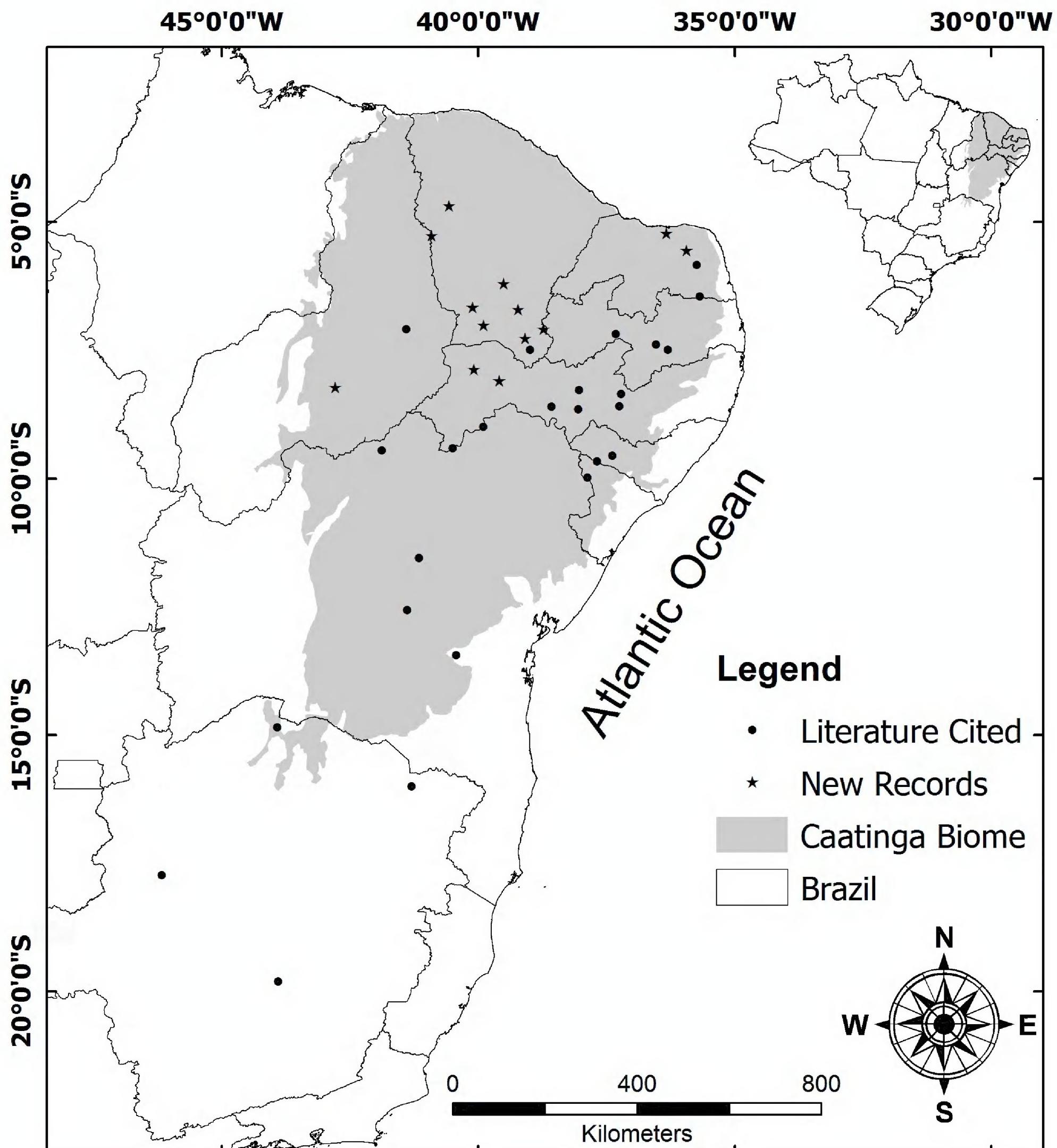
This is the second records of *P. cicada* at Rio Grande do Norte state, extending the known distribution at 140 Km west from the municipality of Santa Maria, state of Rio Grande do Norte (05°50'01.78"S, 35°44'20.37"W) (Jorge and Freire 2012). The municipality of Brejo do Piauí is



**FIGURE 1.** An adult male of *Physalaemus cicada* collected buried, from Ouricuri municipality, Pernambuco, Brazil. Photo: R.W. Ávila.

the second locality record of *P. cicada* in the state of Piauí, extending the distribution at about 287 Km south-west from municipality of Picos ( $07^{\circ}5'15.88''S$ ,  $41^{\circ}24'1.67''W$ ) (Benício *et al.* 2012). Moreover, the new records reported

here fills gaps of distribution of *P. cicada* at Ceará and Pernambuco states and are important contributions to the knowledge of distribution of *Physalaemus cicada* at northeastern Brazil.



**FIGURE 2.** Known distribution of *Physalaemus cicada* in the Brazilian states. States abbreviations: MG = Minas Gerais; BA = Bahia; SE = Sergipe; AL = Alagoas; PE = Pernambuco; PB = Paraíba; CE = Ceará; PI = Piauí; RN = Rio Grande do Norte. Star = New Record (see Table 1); Black Circles = Literature data.

**TABLE 1.** Localities of known distribution of *Physalaemus cicada*.

STATE	MUNICIPALITY	LATITUDE (S)	LONGITUDE (W)	REFERENCE
Alagoas	São José do Tapera	09°33'28"	37°22'51"	Lisboa and Haddad (2009)
Bahia	Maracás	13°26'28"	40°25'51"	Bokermann (1966)
Bahia	Juazeiro	09°24'42"	40°29'55"	Nascimento et al. (2005)
Bahia	Carnaíba	09°27'06"	41°52'53"	Nascimento et al. (2005)
Bahia	Curaçá	08°59'33"	39°53'59"	Nascimento et al. (2005)
Bahia	Lençóis	12°33'47"	41°23'18"	Santana and Juncá (2007)
Bahia	Morro do Chapéu	11°33'08"	41°09'27"	Leite et al. (2010)
Ceará	Brejo Santo	07°29'36"	38°59'14"	Nascimento et al. (2005)
Ceará	Nova Russas	04°41'07"	40°33'56"	Loebmann and Mai (2008)
Ceará	Acopiara	06°12'22.8	039°30'14.6"	New Record
Ceará	Barro	07°05'29.1	38°43'31.3	New Record
Ceará	Várzea Alegre	06°52'20.5	039°13'03.8	New Record
Ceará	Crateús	5°16'04"	40°54'13"	New Record
Ceará	Aiuaba	06°39'41.7"	40°06'23.3"	New Record
Ceará	Farias Brito	06°78'32"	34°53'31"	New Record
Ceará	Missão Velha	07°15'58.2"	39°04'55.8"	New Record
Minas Gerais	Perda Azul	16°00'19	41°17'50"	Nascimento et al. (2005)
Minas Gerais	Matias Cardoso	14°51'17"	43°55'19"	Nascimento et al. (2005)
Minas Gerais	João Pinheiro	17°43'59"	46°10'00"	Silveira (2006)
Minas Gerais	Belo Horizonte	19°48'18"	43°54'18"	Linares and Mello (2011)
Paraíba	São José do Bonfim	07°11'	37°19	Arzabe (1999), Vieira et al. (2007)
Paraíba	Araruna	06°27'13"	25°40'49"	Arzabe et al. (2005)
Paraíba	Cabaceiras	7°29'20"	36°17'93"	Vieira et al. (2007)
Paraíba	São João do Cariri	7°23'26"	36°32'01"	Vieira et al. (2007)
Pernambuco	Betânia	08°16'29"	38°02'03"	Borges-Nojosa and Santos (2005)
Pernambuco	Floresta	08°36'04"	38°34'07"	Borges-Nojosa and Santos (2005)
Pernambuco	Parnamirim	04°36'78.1"	91°06'41"	New Record
Pernambuco	Ouricuri	08°07'55.7"	040°05'03.2"	New Record
Pernambuco	Usina São José	7°49'14"	35°0'44"	Moura et al. (2011)
Pernambuco	Reserva ecológica de Serra Negra	08°34'	38°04'	Moura et al. (2011)
Pernambuco	Parque Nacional do Catimbau	8°35'29.54"	37°14'44.68"	Moura et al. (2011)
Piauí	Brejo do Piauí	8°13'36"	4°46'51"	New Record
Piauí	Picos	07°5'15.88"	41°24'1.67	Benício et al. (2012)
Rio Grande do Norte	Santa Maria	5°50'01.78"	35°44'20.37"	Jorge and Freire (2012)
Rio Grande do Norte	João Câmara	05°33'	35°56'	New Record
Rio Grande do Norte	Guamaré	05°13'8.45	34°41'6.81"	New Record
Sergipe	Serra da Guia	09°58'52"	37°52'05"	Caldas et al. (2010)
Sergipe	Grota do Angico	09°39'50"	37°40'57"	Caldas et al. (2010)

**ACKNOWLEDGMENTS:** We are grateful to Conselho Nacional de Desenvolvimento Científico e Tecnológico-CNPq for fellowship to MCS (Bolsa de Apoio Técnico 1A) and partial financial support (process 475107/2011-0 and 551993/2011-1), to Pró-Reitoria de Pós Graduação e Pesquisa da Universidade Regional do Cariri – PRPGP/URCA for partial financial support, to FUNCAP for scholarship to I.J.R and for a research fellowship to RWA (process BPI-0067-000060100/12). To Instituto Chico Mendes de Conservação da Biodiversidade-ICMBio for collecting license (SISBIO/ 29613-1). Marcelo N. C. Kokubum and one anonymous reviewer made valuable suggestions on the manuscript.

#### LITERATURE CITED

- Arzabe, C. 1999. Reproductive activity patterns of anurans in two different altitudinal sites within the Brazilian Caatinga. *Revista Brasileira de Zoologia* 16(3): 851-864.
- Arzabe, C., G. Skuk, G.G. Santana, F.R. Delfim, Y.C.C. Lima, and S.H.F. Abrantes. 2005. Herpetofauna da Área de Curimataí, Paraíba; p. 259-274 In F.S. Araújo, M.J.N. Rodal and M.R.V. Barbosa (ed.). *Análise das variações da biodiversidade do bioma Caatinga*. Brasília: Ministério do Meio Ambiente.
- Bokermann, W.C.A. 1966. Notas sobre três espécies de *Physalaemus* de Maracás, Bahia (Amphibia, Leptodactylidae). *Revista Brasileira de Biologia* 26(3): 253-259.
- Borges-Nojosa, D.M. and E.M. Santos. 2005. Herpetofauna da área de Betânia e Floresta, Pernambuco; p. 275-289 In F.S. Araújo, M.J.N. Rodal and M.R.V. Barbosa (ed.). *Análise das variações da biodiversidade do bioma Caatinga*. Brasília: Ministério do Meio Ambiente.
- Benício, R.A, G.R. Silva and M.G. Fonseca. 2012. *Physalaemus cicada* Bokermann, 1966 (Anura: Leiuperidae): Distribution Extension. *Chek List* 8(4): 630-631.
- Caldas, F.L.S., C.B. De-Carvalho, D.O. Santana, R.A. Santos, B.D. Silva and R.G. Faria. 2010. Amphibia, Anura, Leiuperidae, *Physalaemus cicada* Bokermann, 1966: First records for the state of Sergipe. *Check List* 6(3): 427-428.
- Frost, D.R. 2011. *Amphibian Species of the World: an Online Reference*. Version 5.5. Electronic Database accessible at <http://research.amnh.org/vz/herpetology/amphibia/>, American Museum of Natural History, New York, USA. Captured on 15 July 2012.
- Jorge, J. S. and E. M. X. Freire. 2012. *Physalaemus cicada*. Brazil: Rio Grande Do Norte municipality of Santa Maria. *Herpetological Review* 43(4): 613-614.
- Leite, F.S.F., F.A. Juncá and P.C. Eterovick. 2010. Status do conhecimento, endemismo e conservação de anfíbios anuros da Cadeia do Espinhaço, Brasil. *Megadiversidade* 4(1-2): 158-176.
- Linares, A.M. and H.E.S. Mello. 2011. *Physalaemus cicada* Bokerman, 1966 (Anura: Leiuperidae): Distribution extension with new south limit and geographic distribution map. *Check List* 7(6): 859-861.
- Lisboa, B.S. and C.F.B. Haddad. 2009. Amphibia, Anura, Leiuperidae, *Physalaemus cicada* Bokermann, 1966: Distribution extension and geographic distribution map. *Chek List* 5(3): 699-701.
- Loebmann, D. and A.C.G. Mai. 2008. Amphibia, Anura, Leiuperidae, *Physalaemus cicada*: Distribution extension in state of Ceará, Brasil. *Check List* 4(4): 158-176.
- Moura, G.J.B., E.M. Santos, M.A.B. Oliveira, M.C.C. Cabral. 2011. *Herpetologia no estado de Pernambuco*. Brasília. Ibama. 440 p.
- Nascimento, L.B., U. Caramaschi and C.A.G. Cruz. 2005. Taxonomic review of the species groups of the genus *Physalaemus* Fitzinger, 1826 with revalidation of the genera *Engystomops* Jiménez-De-La-Espada, 1872 and *Eupemphix* Steidachner, 1863 (Amphibia, Anura, Leptodactylidae). *Arquivos do Museu Nacional* 63(2): 297-320.
- Santana, A.S and F.A. Juncá. 2007. Diet of *Physalaemus cf. cicada* (Leptodactylidae) and *Bufo granulosus* (Bufonidae) in a semideciduous forest. *Brazilian Journal of Biology* 67(1): 125-131.
- Silveira, A.L. 2006. Anfíbios do município de João Pinheiro, Uma Área de Cerrado no Noroeste de Minas Gerais, Brasil. *Arquivos do Museu Nacional* 64(2): 131-139.
- Vieira, W.L.S., C. Arzabe and G.G. Santana. 2007. Composição e distribuição espaço-temporal de anuros no Cariri Paraibano, Nordeste do Brasil. *Oecologia Brasiliensis* 11(3): 383-396.

RECEIVED: December 2012

ACCEPTED: September 2013

PUBLISHED ONLINE: October 2013

EDITORIAL RESPONSIBILITY: Marcelo Nogueira de Carvalho Kokubum